

CLAIMS

What is claimed is:

1. A method for processing an input video stream comprising a series of pictures, the method comprising the steps of:

10 detecting a first scene change between a first scene in the input video stream and a second scene in the input video stream; and

classifying a first picture in the input video stream as a first intra-picture (I-picture), wherein the first picture coincides with the first scene change.

15 2. The method of Claim 1, further comprising the steps of:

determining whether there are a predetermined number of pictures between the first intra-picture and a second scene change;

classifying a second picture in the input video stream as a second intra-picture, in response to a determination that the predetermined number of pictures exist

20 between the first intra-picture and the second scene change, wherein the second picture coincides with the predetermined number of pictures.

3. The method of Claim 2, further comprising the steps of:

classifying a third picture in the input video stream as a third intra-picture, wherein the third intra-picture coincides with the second scene change.

4. The method of Claim 1, wherein the step of determining a scene change, comprises the step of determining whether a change in a motion vector in the first picture exceeds a predetermined motion vector threshold.

5 5. A system for organizing a series of pictures in an input video stream
into at least one group of pictures (GOP), comprising:

10 a scene change detector operative to detect a scene change in the series
of pictures and to classify a first picture following the scene change as a first intra-
picture (I-picture) and to classify at least one other picture following the scene change
as a predicted picture (P-picture) and to classify at least one second picture as a bi-
directionally predicted picture (B-picture); and

15 a bit allocation module operative to determine whether a first GOP
uses less than a predetermined target number of bits and further operative to allocate
an unneeded bit to a second GOP in response to a determination that the first GOP
uses less than the predetermined target number of bits.

20 6. The system of Claim 5, further comprising a bit rate controller
operative to compare a previous macroblock of a first picture to a subsequent
macroblock in a second picture and to determine that the subsequent macroblock is
different than the previous macroblock.

25 7. The system of Claim 6, wherein the bit rate controller is further
operative to determine a first criterion characterizing the relationship between the
previous macroblock and the subsequent macroblock and to compare the first
criterion to a first threshold value.

30 8. The system of Claim 7, further comprising a decoder operative to
represent the subsequent macroblock in an output video stream, wherein the bit rate
controller is further operative to instruct the decoder to represent the subsequent
macroblock in an identical form as the previous macroblock, in response to a
determination that the first criterion is less than the first threshold value.

5 9. The system of Claim 7, wherein the bit rate controller is further
operative to instruct the decoder to represent the subsequent macroblock in a non-
identical form as the previous macroblock, in response to a determination that the first
criterion is less than the first threshold value.

- 5 10. An encoding system for compressing an input video stream having a series of pictures, the encoding system comprising:
- a video encoder operative to receive the input video stream and an input control stream and to generate an encoded video stream;
- a picture grouping module operative to receive the input video stream
- 10 and to generate at least one adaptive picture grouping for the pictures in the encoded video stream;
- a bit allocation module operative to receive the input video stream and to adaptively allocate bits among the series of pictures and to adaptively allocate bits among the adaptive picture groupings.
- 15 11. The encoding system of Claim 10, wherein the adaptive grouping comprises classifying the pictures in the input video stream as intra-pictures (I-pictures), predicted-pictures (P-pictures), and bidirectionally predicted pictures (B-pictures)
- 20 12. The encoding system of Claim 10, further comprising a bit rate controller operative to compare a previous macroblock of a first picture to a subsequent macroblock in a second picture and to determine that the subsequent macroblock is different than the previous macroblock.
- 25 13. The encoding system of Claim 12, wherein the bit rate controller is further operative to determine a first criterion characterizing the relationship between the previous macroblock and the subsequent macroblock and to compare the first criterion to a first threshold value and to instruct a decoder to represent the subsequent macroblock in an identical form as the previous macroblock, in response to a determination that the first criterion is less than the first threshold value.

- 5 14. A method for selecting a video stream sampling technique, the method comprising the steps of:
- encoding an input video stream using a first sampling technique to generate a first encoded video stream;
 - encoding an input video stream using a second sampling technique to generate a second encoded video stream;
 - 10 comparing at least one characteristic of the first encoded video stream to at least one characteristic of the second encoded video stream;
 - 15 selecting the first encoded video stream as an output encoded video stream, in response to a determination that the at least one characteristic of the first encoded video stream is preferable to the at least one characteristic of the second encoded video stream; and
 - 20 selecting the second encoded video stream as an output encoded video stream, in response to a determination that the at least one characteristic of the second encoded video stream is preferable to the at least one characteristic of the first encoded video stream.

- 5 15. A method for adaptively grouping pictures in an input video stream, the method comprising:
 creating a first group of pictures (GOP);
 classifying a first picture in the input video stream as an intra-picture (I-picture) and adding the first picture to the first GOP;
10 retrieving a second picture from the input video stream
 making a determination as to whether a second picture in the input video stream coincides with a scene change;
 classifying the second picture as an I-picture, in response to a determination that the second picture in the input video stream coincides with a scene change; and
15 classifying the second picture as a non-I-picture and adding the second picture to the first GOP, in response to a determination that the second picture in the input video stream does not coincide with a scene change.
- 20 16. The method of Claim 15, further comprising the step of creating a second GOP and adding the second picture to the second GOP, in response to a determination that the second picture in the input video stream coincides with a scene change.
- 25 17. The method of Claim 16, wherein the first GOP and the second GOP can contain different numbers of pictures.
18. The method of Claim 15, wherein the non-I-picture is a predicted picture (P-picture).
- 30 19. The method of Claim 15, wherein the non-I-picture is a bidirectionally predicted picture (B-picture).

5 20. The method of Claim 15, wherein the determination that the second
picture in the input video stream coincides with a scene change, comprises a making a
determination that a motion vector corresponding to the second picture has been
changed.

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